

車載カメラの画像解析による視程障害検知技術に関する研究

Visibility Hindrance Sensing Technology Based on Analysis of Images Taken by a Vehicle-mounted Camera

暴風雪被害の防止・軽減のため、対策の必要な箇所への吹雪対策施設の導入が進められていますが、適切な要対策箇所を抽出するには視程障害移動観測車で吹雪発生時に繰り返し観測する必要があり、データ取得のために時間とコストが必要になります。

そこで本研究は、視程障害移動観測車に搭載している車載カメラ映像と視程計のデータを使用し、AI（人工知能）による画像解析により吹雪の発生有無を検知する技術開発を進めています。

To prevent and mitigate snowstorm damage, the introduction of blowing snow countermeasures has been promoted. In determining the precise locations for countermeasures, it is necessary to make repeated observations using a visibility observation vehicle during times of blowing snow. Time and finances are required for data acquisition. For this study, we have been promoting the development of a technology that senses the presence or absence of blowing snow by using AI that analyzes images. This technology utilizes the images taken by a video camera mounted on a visibility observation vehicle and also the data collected by a visibility meter.



深層学習による吹雪画像検知実験の概要

Overview of the experiment for determining blowing snow from images based on deep learning

学習用及び検証用のデータは、視程障害移動観測車に装着されているデジタルビデオカメラの動画から静止画を切り出して使用し、切り出した画像の視程は、静止画を切り出した時刻から9秒後までの視程の平均値としています。

学習用及び検証用データは、切り出された画像データと視程の値が1組になっており、それぞれ数百枚ずつ作成します。これらのデータを用いて深層学習による判別モデルの作成を行い、検証と評価によるパラメータの改善やデータの選別などを重ねながら精度の向上を図ります。

吹雪の検知は視程200mで吹雪発生、視程200m以上を吹雪未発生としています。

The data for deep learning and the data for verification were still images extracted from digital video images taken by a digital video camera mounted on the visibility observation vehicle. The visibility distance for each still image was the average visibility distance of those from the time when the still image was taken to seconds later.

For deep learning and verification, we created data consisting of several hundreds of pairs of still images and their visibility values. A determination model for deep learning was created using these data. To improve the accuracy of the system, the parameters will be continuously improved based on verification and on the selection and evaluation of data.

Blowing snow was determined to occur when the visibility distance was 200m or less.

When the visibility distance exceeded 200m, the condition was determined to be the absence of blowing snow.

